I. AMENDMENT

In the Claims:

Please amend claims 128 and 143 as indicated below:

128. (Amended) A plant comprising [the cell of claim 109] a cell transformed with a recombinant DNA construct comprising a plant centromere.

143. (Amended) The transgenic plant of claim [143] 142, wherein said dicotyledonous plant is selected from the group consisting of tobacco, tomato, potato, sugar beet, pea, carrot, cauliflower, broccoli, soybean, canola, sunflower, alfalfa, cotton and *Arabidopsis*.

II. REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. §1.111

A. Status of the Claims

Claims 128-146 were pending in the case at the time of the action. Claims 128 and 143 were amended herein. The amendment to claim 128 was made to insert the subject matter of claim 109, which claim 128 incorporated by reference. The amendment was made necessary by the Restriction Requirement in the case and Applicants election to prosecute Group VI claims herein. The Amendment to claim 143 was made to correct a typographical error. The amendments were not made to narrow the scope of the claims and, accordingly, Applicants do not intend to surrender any subject matter by the amendments. Claims 128-146 are now pending in the case and are presented for reconsideration.

B. Claim Objection

The Action has objected to claim 143 for an informality. The claim has been amended to correct the error. The amendment does not narrow the scope of the claim and accordingly

Applicants do not intend to surrender any subject matter by the amendment. The objection is now moot in view of the amendment.

C. **Rejections Under 35 U.S.C. §102(b)**

The Action rejects claims 128-140, 142 and 144-146 under 35 U.S.C. §102(b) as being anticipated by Richards *et al.* (U.S. Patent No. 5,270,201). In particular, the Action alleges that column 6 at lines 5-31; claims 1-5 and 25; figures 7-8 and 10; column 16, lines 1-47; the Abstract and Example 18 of Richards *et al.* anticipate the subject matter of the present claims by providing a method of isolating centromeres and constructs comprising centromeres and, thereby, inherently teaching plant centromeres. Applicants respectfully traverse as set forth below.

Richards *et al.* is directed to the isolation and cloning of telomere, not centromere, sequences from higher eukaryotes. As an example of this, Richards *et al.* describes the isolation and cloning of the telomeres of *Arabidopsis thaliana.* Richards *et al.* then suggests a number of applications in which such telomeres might be used, for example, in the construction of artificial chromosomes. However, unlike the instant invention, Richards *et al.* does not provide specific segments of DNA which contain plant centromeres. Therefore, the reference cannot anticipate the instant claims.

Richards *et al.* does suggest that cloned telomeres could be used to facilitate the isolation of centromere sequences for use in the construction of artificial chromosomes. However, the feasibility of this approach has not been demonstrated. In the scheme described in Richards *et al.*, it is suggested that telomere sequences can be used to identify fragments of DNA containing centromere sequences from special lines of *Arabidopsis* called telotrisomics. Telotrisomics are

mutants which contain an extra, modified copy of one chromosome. The extra chromosomal copy has one normal arm and one arm which is truncated at or near the centromere, and capped by a telomere. Richards *et al.* suggests that by digesting genomic DNA from such telotrisomic lines with restriction enzymes and performing Southern blot analysis using telomere sequences as a probe, a novel fragment containing both the telomere of the truncated arm and the adjacent centromere could be identified. This isolated centromere allegedly would then be incorporated into artificial chromosome constructs and subjected to various assays to confirm centromere function. However, the feasibility of such an approach has not been demonstrated. Indeed, in the more than 8 years since the issuance of the Richards *et al.* patent, the instant inventors are not aware of a single use of this approach to successfully isolate a centromere from *Arabidopsis*. This may well be due to an intrinsic flaw in the proposed scheme.

With regard to Figures 7 and 8, these figures are said to describe methods for preparing minichromosome vectors and for shotgun cloning of autonomous replicating sequences. The figures do not, however, provide plant centromere sequences or any proven method for isolating such centromeres. Further, autonomous replicating sequences are not centromeres. The Richards specification itself indicates this at column 3, lines 5-15, where it is stated that both centromeres and autonomous replicating sequences are each necessary components for proper replication and partitioning of chromosomes. It is also indicated that the autonomous replicating sequences "have properties of replication origins, which are the sites for initiation of DNA replication". This does not describe a centromere.

Figure 10 (and Example 14) describes the construction of an artificial plant chromosome using telomeres, an origin of replication, and centromeres allegedly isolated using the methods in Examples 1-13. However, other than telomere sequences, the inventors do not specify any DNA

which can be used as a centromere or origin of replication. As described in detail above, the example thus does not cure the fatal defect of the reference in failing to provide a plant centromere.

As also indicated above, the Examples of Richards *et al.* do not provide a plant centromere sequence. Example 18, which is specifically cited in the Action, is described as a method of isolating autonomous replicating sequences. Autonomous replicating sequences are not centromeres and the example does not claim to be a method of isolating centromeres. Example 18 thus does not describe a method of identifying centromeres. The other Examples of Richards *et al.* also do not provide a plant centromere. Example 8 of Richards *et al.* demonstrates the scheme proposed for isolating novel restriction fragments from the *Arabidopsis* telotrisomic line Tr5A. The example reports showing that Tr5A contains a novel 15 kb DraI restriction fragment that can be detected by hybridization with the *telomeric* sequence probe pAtT4. The example does not, however, show that the restriction fragment contains a plant centromere. Therefore, the example does not anticipate the instant claims.

Example 9 is a rather vague prophetic example allegedly describing a method for the isolation of plant centromeres using cloned plant telomeres, such as using the cloned restriction fragment generated in Example 8. Again, the example fails to demonstrate that the resultant cloned fragment would contain a centromere. The example, therefore, does not anticipate the instant claims.

Examples 12 and 13 are reported to describe methods for isolating autonomous replicating sequences. However, even if one were to assume that the examples do teach isolation of autonomous replicating sequences, they do not cure the defects in the remainder of the

reference. In particular, the examples do not anticipate the claims as they fail, like the rest of the reference, to provide a plant centromere.

The Action also alleges that claims 1-5 and 25 of Richards *et al.* anticipate the instant claims. In response, Applicants first note that, tellingly, none of the claims refer to a plant centromere sequence. Claim 2 does refer to a *yeast* centromere sequence and various other elements are referred to in the other claims, including telomeres, autonomous replicating sequences, selectable marker genes and desired gene sequences. However, yeast artificial chromosomes, which contain yeast centromeres, do not function in higher eukaryotes (see review by Lamb, Curr. Opin. Gen. and Dev. 1995, 5: 342-348). Further, as indicated above, Richards *et al.* does not specify a DNA segment which could be used as a centromere. Such a DNA segment would be necessary to maintain a DNA molecule as a chromosome. In the absence of providing such a DNA sequence comprising a plant centromere, Richards *et al.* does not anticipate the claims.

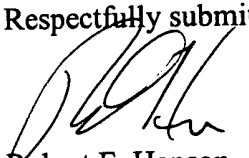
The Abstract; Column 1, lines 19-34; Column 6, lines 5-31; column 16, lines 1-47 and Column 18, lines 30-55 add nothing to the rejection. These sections variously and generally report to provide a method of obtaining centromeres or of providing recombinant DNA sequences comprising centromeres, but universally fail to provide such sequences. Again, absent such a teaching, the reference cannot anticipate the claims.

In view of the foregoing, removal of the rejection under 35 U.S.C. §102 is respectfully requested.

D. Conclusion

In light of the foregoing, applicants submit that all claims are in condition for allowance, and an early indication to that effect is earnestly solicited. The examiner is invited to contact the undersigned (512)536-3085 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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